What is claimed is:

1. A biocompatible polymer of the following general formula (I):

$$A_aX_xY_y$$

wherein:

- A represents a monomer,

- X represents a carboxyl group bonded to monomer A and is contained within a group according to the following formula: -R-COO-R', in which R is a bond or an aliphatic hydrocarbon chain, optionally branched and/or unsaturated, and which can contain one or more aromatic rings except for benzylamine and benzylamine sulfonate, and R' represents a hydrogen atom or a cation,

- Y represents a sulfate or sulfonate group bonded to monomer A and is contained within a group according to one of the following formulas: -R-O-$SO_3$-R', -R-N-$SO_3$-R', -R-$SO_3$-R', in which R is a bond or an aliphatic hydrocarbon chain, optionally branched and/or unsaturated, and which can contain one or more aromatic rings except for benzylamine and benzylamine sulfonate, and R' represents a hydrogen atom or a cation,

- a represents the number of monomers A such that the mass of said polymers of formula (I) is greater than approximately 5,000 da,

- x represents a substitution rate of the monomers A by the groups X, which is between approximately 20 and 150%, and

- y represents a substitution rate of the monomers A by the groups Y, which is between approximately 30 and 150%.

2. The biocompatible polymer according to Claim 1, wherein radical R of the group X and Y is selected from the group consisting of alkyl, allyl, aryl, linear and branched groups.

3. The biocompatible polymer according to Claim 1, wherein the monomers A, which can be identical or different, are selected from the group consisting of sugars, esters, alcohols, amino acids and nucleotides.

4. The biocompatible polymer according to Claim 1, wherein at least one monomer A is an A-ose.

5. The biocompatible polymer according to Claim 1, further comprising at least one functional chemical group Z, which is different from X and Y, and which confers supplementary biological or physicochemical properties.

6. The biocompatible polymer according to Claim 5, wherein the rate of substitution of monomers A by groups Z is between approximately 0 and 50%.

7. The biocompatible polymer according to Claim 5, wherein at least one of the groups Z is a substance which confers on the polymer additional solubility or lipophilic properties.

8. The biocompatible polymer according to Claim 7, wherein the groups Z, which can be identical or different, are selected from the group consisting of amino acids, fatty acids, fatty alcohols, ceramides or derivatives thereof, and nucleotide addressing sequences.

9. The biocompatible polymer according to Claim 5, wherein the groups Z, which can be identical or different, are therapeutic or diagnostic agents.

10. The biocompatible polymer according to Claim 9, wherein the group Z is selected from the group consisting of an anti-inflammatory, antimicrobial, antibiotic, enzyme and a growth factor.

11. The biocompatible polymer according to Claim 1, wherein the groups X, Y and Z are bonded directly to the monomer A, or bonded to each other with only one of them being bonded to the monomer A.

12. The biocompatible polymer according to Claim 5, wherein the groups Z are covalently bonded directly to the monomers A or covalently boned to the X and/or Y groups.

13. The biocompatible polymer according to Claim 5, wherein the groups Z are conjugated to the polymers of formula (I) by bonds other than covalent bonds.

14. The biocompatible polymer according to Claim 13, wherein the groups Z are conjugated to the polymers of formula (I) by ionic or hydrophilic interaction.

15. A pharmaceutical or diagnostic composition comprising at least one polymer according to Claim 1 and a pharmaceutically acceptable vehicle.

16. The composition according to Claim 15, wherein the biocompatible polymer and the pharmaceutically acceptable vehicle are in a form enabling at least one of local, intravenous, intra-arterial, intramuscular, intraperitoneal, or intraocular administration, administration into cerebrospinal fluid or directly into a central nervous system, or via oral, per - cutaneous, subcutaneous, topical routes, into at least one fluid compartment of an organism.

17. The composition according to Claim 15, formulated to enable administration of about 0.001 to about 1 milligram of polymer per square centimeter or of about 0.005 to about 1 milligram of polymer per cubic centimeter of tissue to be treated.

18. The composition according to Claim 15, containing between about 0.01 and about 10 milligrams of polymer per milliliter of physiological solution of dissolution.

19. The composition according to Claim 15, formulated to enable administration via systemic, intraperitoneal or intraocular route, into cerebrospinal fluid, intracochlear fluid or into any peritissular or intratissular fluids, of between about 0.1 and about 100 milligrams of polymer per kilogram of weight of a human or animal to be treated.

20. The composition according to Claim 15, formulated to enable administration via intramuscular route of between about 0.2 and about 500 milligrams of polymer per kilogram of weight of a human or animal to be treated.

21. The composition according to Claim 15, formulated to enable administration via oral route of between about 1 and about 5000 milligrams of polymer per kilogram of weight of a human or animal to be treated.

22. The composition according to Claim 15 which is free of significant anticoagulant activity.

23. A process for the stabilization and potentiation of growth factors that present an affinity for heparin comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 15.

24. A process for protection of growth factors that present an affinity for heparin against proteolytic agents comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 15.

25. A process for the inhibition of protease activities which cause inflammation comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 15.

26. A process for treating and/or preventing injuries and diseases of tissues or organs comprising administering a therapeutically effective amount of a pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

27. A process for treating and/or preventing lesions of muscle, nervous system or gastrointestinal tract tissues comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 1.

28. A process for cutaneous cicatrization comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 1.

29. A process for cicatrization of a cornea comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 1.

30. A process for cicatrization of flat bone comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 1.

31. A process for cicatrization of long bone comprising administering a therapeutically effective amount of the pharmaceutical composition according to Claim 1.

32. A process for treating and/or preventing inflammation comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

33. A process for regulating homeostasis of the mass and functionality of tissues and organs comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

34. A process for tissular and cellular regeneration, protection, preservation and aging *in vivo* and *ex vivo* comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

35. A process for treating and/or preventing deleterious effects of ischemia, ionizing radiation and oxidizing products induced in pathologies or stress or supplied in food comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1 alone or in combination with SOD.

36. A process for preservation and protection against ischemia comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

37. A process for treating and/or preventing pathologies associated with hypoxia, cellular degeneration, neuropathies, myopathies, hepatopathies, nephropathies, cardiopathies, and peroxidations of lipids comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

38. A process for conservation of tissues, organs and prostheses comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

39. A process for treating and/or preventing cardiac and nervous diseases comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

40. A process for treating and/or preventing diseases associated with anarchic growth of cells and pathological processes related to angiogenesis comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

41. A process for treating and/or preventing deleterious effects of ionizing radiation comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

42. A process for treating and/or preventing fibroses comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

43. A process for regulation of proliferation of mesenchymal cells and regulation of the quality of the type of collagen that such cells secrete comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

44. A process for treating and/or preventing pulmonary, renal, hepatic, cardiac, vascular and dermatological pathologies, pathologies of grafts and their functional integration, of multiple derivatives linked to parasitism comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

45. A process for treating and/or preventing lesions and diseases induced by an oxidative stress and oxidizing agents comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

46. A process for preserving foods and nutriments that naturally contain antioxidants or to which antioxidants were added as antioxidant agents comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1.

47. A composition which comprises at least one biocompatible polymer according to Claim 1 and animal or plant SOD.

48. A process for treating and/or preventing aggressions, diseases or degeneration of nervous tissues comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

49. A process for treating and/or preventing aging comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

50. A process for treating and/or preventing diseases of the heart, brain or central nervous system comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

51. A process for treating and/or preventing lesions of the spinal cord or retina comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

52. A process for treating and/or preventing respiratory insufficiencies associated with diaphragmatic fatigue comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

53. A process for treating and/or preventing deleterious effects associated with diabetes comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

54. A process for treating and/or preventing leprosy comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

55. A process for treating and/or preventing endotoxic shock comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

56. A process for treating and/or preventing invasion by a pathogenic agent comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

57. A process for a radiotherapy procedure for treating cancers comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

58. A process for treating and/or preventing effects induced by ultraviolet rays comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

59. A process for treating and/or preventing hypertension comprising administering to a patient in need a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.

60. A process for treating and/or preventing tissular lesions and disorders found in traumatology comprising administering a therapeutically effective amount of the pharmaceutical composition which comprises at least one biocompatible polymer according to Claim 1, alone or in association with SOD.